

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 2

RECEIVED
CENTRAL FAX CENTER
FEB 28 2007

The listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

The listing of the claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) Method for load transfer in a container storage space for standard containers, with a stacker crane for the containers servicing the container storage space, controllable by a logistical management data processing (DP) system, wherein the stacker crane can travel between a storage place for each container and a loading platform of a transport vehicle of a container that can travel in the area of the container storage space, wherein the stacker crane has a load suspension device for depositing the container on the loading platform and picking the container up from the loading platform, which can be oriented with respect to it, the method of loading and unloading the transport vehicle comprising:
 - a) identifying the transport vehicle and the container being unloaded and transferring the data generated in this way to the logistical management DP system,
 - b) providing a calibrated camera system, detecting defined identification points on the loading platform of the transport vehicle and on the container with said camera system and transferring coordinates of the identification points to the logistical management DP system,
 - c) comparing with the logistical management DP system the coordinates of the identification points against the data of the container being loaded as stored in the DP system and determining the fastener to be assigned to this container and position coordinates on the loading platform of the transport vehicle,

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 3

- d) driving the stacker crane under computer control with the container to be loaded above the loading platform of the transport vehicle, above the position coordinate, wherein the position coordinate is defined by the vertical position of the loading platform and by the point of intersection of the diagonals of the identification points of the loading platform, wherein the position coordinate describes the target position of the container.
- e) providing a calibrated camera system arranged on the trolley of the stacker crane, detecting the fastener of the loading platform and selectively moving the container so that the fastener of the container is positioned above the coordinated fastener of the loading platform,
- f) setting down the container on the loading platform of the transport vehicle such that the fastener of the container and the coordinated fastener of the loading platform mate together at the end of the setdown process[.].
- g) determining with the logistical management DP system, from the identification points, the fastener and position coordinate of the container,
- h) driving the stacker crane under computer control above the container, above the position coordinate, while the position coordinate is described by the vertical position of the upper edge of the identification points of the container and by the point of intersection of the diagonals of the identification points of the container, which describes the absolute target position of the load suspension device,
- i) detecting the fastener of the loading platform of the container and selectively moving the load suspension device so that the fastener of the load suspension device of the stacker crane stands above the coordinated fastener of the container, and
- j) bringing the load suspension means up to the container such that the fastener of the load suspension means and the fastener of the container mate together.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 4

2. ~~(Currently Amended) Method for load transfer in a container storage space for standard containers, with a stacker crane for the containers servicing the container storage space, controllable by a logistical management data processing (DP) system, wherein the stacker crane can travel between a storage place for each container and a loading platform of a transport vehicle of a container that can travel in the area of the container storage space, wherein the stacker crane has a load suspension device for picking the container up from the loading platform, which can be oriented with respect to it, the method of unloading of a transport vehicle comprising: The method of claim 1, wherein the method of unloading the transport vehicle comprises:~~

- a) identifying the transport vehicle and the container being unloaded and transferring the data generated in this way to the logistical management DP system,
- b) providing a calibrated camera system, detecting defined identification points of the container with said camera system and transferring coordinates of the identification points to the logistical management DP system,
- c) determining with the logistical management DP system, from the identification points, the fastener and position coordinate of the container,
- d) driving the stacker crane under computer control above the container, above the position coordinate, while the position coordinate is described by the vertical position of the upper edge of the identification points of the container and by the point of intersection of the diagonals of the identification points of the container, which describes the absolute target position of the load suspension device,
- e) providing a calibrated camera system arranged on the trolley of the stacker crane, detecting the fastener of the loading platform of the container and selectively moving the load suspension device so that the fastener of the load suspension device of the stacker crane stands above the coordinated fastener of the container,

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 5

f) bringing the load suspension means up to the container such that the fastener of the load suspension means and the fastener of the container mate together.

3. (Previously Presented) Method according to claim 2, wherein the transport vehicle or the container being unloaded is identified by means of a camera system.

4. (Previously Presented) Method according to claim 3, wherein said detecting the coordinates of the identification points of the loading platform or the identification points of the container comprises providing a user-defined interface on a monitor screen of the logistical management DP system, and selecting by an operator of the identification points of the loading platform or the identification points of the container with a marking mechanism on the user-defined interface.

5. (Previously Presented) Method according to claim 4, including automatically detecting the coordinates of the identification points of the loading platform or the identification points of the container by a computer system and transferring the coordinates to the logistical management DP system.

6. (Previously Presented) Method according to claim 5, wherein said automatically detecting of the coordinates of the loading platform of the transport vehicle occurs in its loading and unloading zone and that of the coordinates of the loading platform of the container occurs in its loading and unloading zone.

7. (Previously Presented) Method according to claim 6, wherein the automatically detecting of the coordinates of the loading platform of the transport vehicle or the coordinates of the container occurs in the identification zone.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 6

8. (Previously Presented) Method according to claim 7, wherein the vertical position of the loading platform and the point of intersection of the diagonals of the identification points of the loading platform or the vertical position of the upper edge of the identification points of the container and the point of intersection of the diagonals of the identification points of the container describe the relative target position of the container.

9. (Previously Presented) Method according to claim 8, wherein the position coordinate is described by the absolute target position of the container or of the load suspension device, which is composed of the coordinates of the transport vehicle located in the parking position as detected by means of a camera and the relative target position of the container or of the load suspension device.

10. (Previously Presented) Method according to claim 9, including moving the stacker crane into reach of the loading platform or of the container in such a way that the point of intersection of the diagonals of the fastener of the container or the load suspension device stands plumb above the point of intersection of the diagonals of the fastener of the loading platform or the container.

11. (Previously Presented) Method according to claim 10, including providing a second user-defined interface, said second user defined interface having four quadrants, each representing a pair of fasteners, and each pair consists of one fastener of the loading platform or of the container, projected by an image of the camera system, and of the coordinated fastener of the container or the load suspension device, projected by a superimposing of a computer-calculated contour of the container or of the load suspension means and of the fastener of the container or of the load suspension means onto the image.

12. (Previously Presented) Method according to claim 11, including determining any deviation in position of the container being loaded from the position of the loading platform or the position of the load suspension device from the position of the container being unloaded in the logistical management DP system for a fine-tuned positioning, by providing the second user-defined interface of logistical management with a second marking

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 7

mechanism, wherein the operator selects at least one identification point of the loading platform or of the container with said second marking mechanism.

13. (Previously Presented) Method according to claim 12, including providing a fine positioning computer system and automatically recognizing any deviation in position of the container being loaded from the position of the loading platform or in the position of the load suspension device from the position of the container being unloaded with said fine positioning computer system.

14. (Previously Presented) Method according to claim 13, wherein a deviation in position of the container being loaded from the position of the loading platform of the container or in the position of the load suspension device from the container being unloaded, the load suspension device is rotated so that the fastener of the container stands plumb above the fastener of the loading platform, or the fastener of the load suspension device stands plumb above the fastener of the container.

15. (Previously Presented) Method according to claim 14, including setting down and releasing of the container from the load suspension device or the setting down of the load suspension device of the stacker crane onto the container by the operator until the fasteners mate with each other.

16. (Previously Presented) Method according to claim 15, including adjusting the position of a stacker crane in a container storage space, said adjusting the position comprising providing a camera system having at least one calibrated camera fastened on the trolley of the stacker crane for detection of the position of containers being handled, with an absolute length measuring system to detect the position of the stacker crane, positioning the stacker crane travels above a reference point arranged at any given position within the container yard, so that said at least one calibrated camera of the camera system detects the reference point, and comparing the position of the reference point with the memorized position of the reference point with the logical management DP system and determining an offset when a deviation exists.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 8

17. (Previously Presented) Method according to claim 16, characterized in that the container yard has several reference points, which can be detected by the cameras of the stacker crane.

18. (Previously Presented) Method according to claim 15 for adjusting the position of the at least one calibrated camera, which is arranged on the stacker crane including defining an absolute length measuring system for detecting the position of the stacker crane, characterized in that the container yard has a super-reference point and said at least one calibrated camera is arranged on the stacker crane that can be adjusted relative to it by means of the super-reference point.

19. (Previously Presented) Method according to claim 1, wherein the transport vehicle or the container being unloaded is identified by means of a camera system.

20. (Previously Presented) Method according to claim 19, wherein said detecting the coordinates of the identification points of the loading platform or the identification points of the container comprises providing a user-defined interface on a monitor screen of the logistical management DP system, and selecting by an operator of the identification points of the loading platform or the identification points of the container with a marking mechanism on the user-defined interface.

21. (Previously Presented) Method according to claim 20, including automatically detecting the coordinates of the identification points of the loading platform or the identification points of the container by a computer system and transferring the coordinates to the logistical management DP system.

22. (Previously Presented) Method according to claim 21, wherein said automatically detecting of the coordinates of the loading platform of the transport vehicle occurs in its loading and unloading zone and that of the coordinates of the loading platform of the container occurs in its loading and unloading zone.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 9

23. (Previously Presented) Method according to claim 22, wherein the automatically detecting of the coordinates of the loading platform of the transport vehicle or the coordinates of the container occurs in the identification zone.

24. (Previously Presented) Method according to claim 23, wherein the vertical position of the loading platform and the point of intersection of the diagonals of the identification points of the loading platform or the vertical position of the upper edge of the identification points of the container and the point of intersection of the diagonals of the identification points of the container describe the relative target position of the container.

25. (Previously Presented) Method according to claim 24, wherein the position coordinate is described by the absolute target position of the container or of the load suspension device, which is composed of the coordinates of the transport vehicle located in the parking position as detected by means of a camera and the relative target position of the container or of the load suspension device.

26. (Previously Presented) Method according to claim 25, including moving the stacker crane into reach of the loading platform or of the container in such a way that the point of intersection of the diagonals of the fastener of the container or the load suspension device stands plumb above the point of intersection of the diagonals of the fastener of the loading platform or the container.

27. (Previously Presented) Method according to claim 26, including providing a second user-defined interface, said second user defined interface having four quadrants, each representing a pair of fasteners, and each pair consists of one fastener of the loading platform or of the container, projected by an image of the camera system, and of the coordinated fastener of the container or the load suspension device, projected by a superimposing of a computer-calculated contour of the container or of the load suspension means and of the fastener of the container or of the load suspension means onto the image.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 10

28. (Previously Presented) Method according to claim 27, including determining any deviation in position of the container being loaded from the position of the loading platform or the position of the load suspension device from the position of the container being unloaded in the logistical management DP system for a fine-tuned positioning, by providing the second user-defined interface of logistical management with a second marking mechanism, wherein the operator selects at least one identification point of the loading platform or of the container with said second marking mechanism.

29. (Previously Presented) Method according to claim 28, including providing a fine positioning computer system and automatically recognizing any deviation in position of the container being loaded from the position of the loading platform or in the position of the load suspension device from the position of the container being unloaded with said fine positioning computer system.

30. (Previously Presented) Method according to claim 29, wherein a deviation in position of the container being loaded from the position of the loading platform of the container or in the position of the load suspension device from the container being unloaded, the load suspension device is rotated so that the fastener of the container stands plumb above the fastener of the loading platform, or the fastener of the load suspension device stands plumb above the fastener of the container.

31. (Previously Presented) Method according to claim 30, including setting down and releasing of the container from the load suspension device or the setting down of the load suspension device of the stacker crane onto the container by the operator until the fasteners mate with each other.

32. (Previously Presented) Method according to claim 31, including adjusting the position of a stacker crane in a container storage space, said adjusting the position comprising providing a camera system having at least one calibrated camera fastened on the trolley of the stacker crane for detection of the position of containers being handled, with an absolute length measuring system to detect the position of the stacker crane, positioning the stacker

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 11

crane travels above a reference point arranged at any given position within the container yard, so that said at least one calibrated camera of the camera system detects the reference point, and comparing the position of the reference point with the memorized position of the reference point with the logical management DP system and determining an offset when a deviation exists.

33. (Previously Presented) Method according to claim 32, characterized in that the container yard has several reference points, which can be detected by the cameras of the stacker crane.

34. (Previously Presented) Method according to claim 33 for adjusting the position of the at least one calibrated camera, which is arranged on the stacker crane including defining an absolute length measuring system for detecting the position of the stacker crane, characterized in that the container yard has a super-reference point and said at least one calibrated camera is arranged on the stacker crane that can be adjusted relative to it by means of the super-reference point.

35. (Previously Presented) Method according to claim 1, wherein said detecting the coordinates of the identification points of the loading platform or the identification points of the container comprises providing a user-defined interface on a monitor screen of the logistical management DP system, and selecting by an operator of the identification points of the loading platform or the identification points of the container with a marking mechanism on the user-defined interface.

36. (Previously Presented) Method according to claim 1, including automatically detecting the coordinates of the identification points of the loading platform or the identification points of the container by a computer system and transferring the coordinates to the logistical management DP system.

37. (Previously Presented) Method according to claim 1, wherein said automatically detecting of the coordinates of the loading platform of the transport vehicle occurs in its

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 12

loading and unloading zone and that of the coordinates of the loading platform of the container occurs in its loading and unloading zone.

38. (Previously Presented) Method according to claim 1, wherein the automatically detecting of the coordinates of the loading platform of the transport vehicle or the coordinates of the container occurs in the identification zone.

39. (Previously Presented) Method according to claim 1, wherein the vertical position of the loading platform and the point of intersection of the diagonals of the identification points of the loading platform or the vertical position of the upper edge of the identification points of the container and the point of intersection of the diagonals of the identification points of the container describe the relative target position of the container.

40. (Previously Presented) Method according to claim 1, wherein the position coordinate is described by the absolute target position of the container or of the load suspension device, which is composed of the coordinates of the transport vehicle located in the parking position as detected by means of a camera and the relative target position of the container or of the load suspension device.

41. (Previously Presented) Method according to claim 1, including moving the stacker crane into reach of the loading platform or of the container in such a way that the point of intersection of the diagonals of the fastener of the container or the load suspension device stands plumb above the point of intersection of the diagonals of the fastener of the loading platform or the container.

42. (Previously Presented) Method according to claim 1, including providing a second user-defined interface, said second user defined interface having four quadrants, each representing a pair of fasteners, and each pair consists of one fastener of the loading platform or of the container, projected by an image of the camera system, and of the coordinated fastener of the container or the load suspension device, projected by a superimposing of a

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 13

computer-calculated contour of the container or of the load suspension means and of the fastener of the container or of the load suspension means onto the image.

43. (Previously Presented) Method according to claim 1, including determining any deviation in position of the container being loaded from the position of the loading platform or the position of the load suspension device from the position of the container being unloaded in the logistical management DP system for a fine-tuned positioning, by providing the second user-defined interface of logistical management with a second marking mechanism, wherein the operator selects at least one identification point of the loading platform or of the container with said second marking mechanism.

44. (Previously Presented) Method according to claim 1, including providing a fine positioning computer system and automatically recognizing any deviation in position of the container being loaded from the position of the loading platform or in the position of the load suspension device from the position of the container being unloaded with said fine positioning computer system.

45. (Previously Presented) Method according to claim 1, wherein a deviation in position of the container being loaded from the position of the loading platform of the container or in the position of the load suspension device from the container being unloaded, the load suspension device is rotated so that the fastener of the container stands plumb above the fastener of the loading platform, or the fastener of the load suspension device stands plumb above the fastener of the container.

46. (Previously Presented) Method according to claim 1, including setting down and releasing of the container from the load suspension device or the setting down of the load suspension device of the stacker crane onto the container by the operator until the fasteners mate with each other.

47. (Previously Presented) Method according to claim 1, including adjusting the position of a stacker crane in a container storage space, said adjusting the position comprising

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 14

providing a camera system having at least one calibrated camera fastened on the trolley of the stacker crane for detection of the position of containers being handled, with an absolute length measuring system to detect the position of the stacker crane, positioning the stacker crane travels above a reference point arranged at any given position within the container yard, so that said at least one calibrated camera of the camera system detects the reference point, and comparing the position of the reference point with the memorized position of the reference point with the logistical management DP system and determining an offset when a deviation exists.

48. (Previously Presented) Method according to claim 47, characterized in that the container yard has several reference points, which can be detected by the cameras of the stacker crane.

49. (Previously Presented) Method according to claim 1 for adjusting the position of the at least one calibrated camera, which is arranged on the stacker crane including defining an absolute length measuring system for detecting the position of the stacker crane, characterized in that the container yard has a super-reference point and said at least one calibrated camera is arranged on the stacker crane that can be adjusted relative to it by means of the super-reference point.

50. (Previously Presented) Method according to claim 2, wherein said detecting the coordinates of the identification points of the loading platform or the identification points of the container comprises providing a user-defined interface on a monitor screen of the logistical management DP system, and selecting by an operator of the identification points of the loading platform or the identification points of the container with a marking mechanism on the user-defined interface.

51. (Previously Presented) Method according to claim 2, including automatically detecting the coordinates of the identification points of the loading platform or the identification points of the container by a computer system and transferring the coordinates to the logistical management DP system.

Serial No. : 10/506.460
Filing Date : February 28, 2005
Page 15

52. (Previously Presented) Method according to claim 2, wherein said automatically detecting of the coordinates of the loading platform of the transport vehicle occurs in its loading and unloading zone and that of the coordinates of the loading platform of the container occurs in its loading and unloading zone.

53. (Previously Presented) Method according to claim 2, wherein the automatically detecting of the coordinates of the loading platform of the transport vehicle or the coordinates of the container occurs in the identification zone.

54. (Previously Presented) Method according to claim 2, wherein the vertical position of the loading platform and the point of intersection of the diagonals of the identification points of the loading platform or the vertical position of the upper edge of the identification points of the container and the point of intersection of the diagonals of the identification points of the container describe the relative target position of the container.

55. (Previously Presented) Method according to claim 2, wherein the position coordinate is described by the absolute target position of the container or of the load suspension device, which is composed of the coordinates of the transport vehicle located in the parking position as detected by means of a camera and the relative target position of the container or of the load suspension device.

56. (Previously Presented) Method according to claim 2, including moving the stacker crane into reach of the loading platform or of the container in such a way that the point of intersection of the diagonals of the fastener of the container or the load suspension device stands plumb above the point of intersection of the diagonals of the fastener of the loading platform or the container.

57. (Previously Presented) Method according to claim 2, including providing a second user-defined interface, said second user defined interface having four quadrants, each representing a pair of fasteners, and each pair consists of one fastener of the loading platform

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 16

or of the container, projected by an image of the camera system, and of the coordinated fastener of the container or the load suspension device, projected by a superimposing of a computer-calculated contour of the container or of the load suspension means and of the fastener of the container or of the load suspension means onto the image..

58. (Previously Presented) Method according to claim 2, including determining any deviation in position of the container being loaded from the position of the loading platform or the position of the load suspension device from the position of the container being unloaded in the logistical management DP system for a fine-tuned positioning, by providing the second user-defined interface of logistical management with a second marking mechanism, wherein the operator selects at least one identification point of the loading platform or of the container with said second marking mechanism.

59. (Previously Presented) Method according to claim 2, including providing a fine positioning computer system and automatically recognizing any deviation in position of the container being loaded from the position of the loading platform or in the position of the load suspension device from the position of the container being unloaded with said fine positioning computer system.

60. (Previously Presented) Method according to claim 2, wherein a deviation in position of the container being loaded from the position of the loading platform of the container or in the position of the load suspension device from the container being unloaded, the load suspension device is rotated so that the fastener of the container stands plumb above the fastener of the loading platform, or the fastener of the load suspension device stands plumb above the fastener of the container.

61. (Previously Presented) Method according to claim 2, including setting down and releasing of the container from the load suspension device or the setting down of the load suspension device of the stacker crane onto the container by the operator until the fasteners mate with each other.

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 17

62. (Previously Presented) Method according to claim 2, including adjusting the position of a stacker crane in a container storage space, said adjusting the position comprising providing a camera system having at least one calibrated camera fastened on the trolley of the stacker crane for detection of the position of containers being handled, with an absolute length measuring system to detect the position of the stacker crane, positioning the stacker crane travels above a reference point arranged at any given position within the container yard, so that said at least one calibrated camera of the camera system detects the reference point, and comparing the position of the reference point with the memorized position of the reference point with the logical management DP system and determining an offset when a deviation exists.

63. (Previously Presented) Method according to claim 62, characterized in that the container yard has several reference points, which can be detected by the cameras of the stacker crane.

64. (Previously Presented) Method according to claim 2 for adjusting the position of the at least one calibrated camera, which is arranged on the stacker crane including defining an absolute length measuring system for detecting the position of the stacker crane, characterized in that the container yard has a super-reference point and said at least one calibrated camera is arranged on the stacker crane that can be adjusted relative to it by means of the super-reference point.

65. (New) The method of claim 1, wherein the method of loading the transport vehicle comprises:

- a) identifying the transport vehicle and transferring the data generated in this way to the logistical management DP system,
- b) providing a calibrated camera system, detecting defined identification points on the loading platform of the transport vehicle with said camera system and transferring coordinates of the identification points to the logistical management DP system,

Serial No. : 10/506,460
Filing Date : February 28, 2005
Page 18

- c) comparing with the logistical management DP system the coordinates of the identification points against the data of the container being loaded as stored in the DP system and determining the fastener to be assigned to this container and position coordinates on the loading platform of the transport vehicle,
- d) driving the stacker crane under computer control with the container to be loaded above the loading platform of the transport vehicle, above the position coordinate, wherein the position coordinate is defined by the vertical position of the loading platform and by the point of intersection of the diagonals of the identification points of the loading platform, wherein the position coordinate describes the target position of the container,
- e) providing a calibrated camera system arranged on the trolley of the stacker crane, detecting the fastener of the loading platform and selectively moving the container so that the fastener of the container is positioned above the coordinated fastener of the loading platform,
- f) setting down the container on the loading platform of the transport vehicle such that the fastener of the container and the coordinated fastener of the loading platform mate together at the end of the setdown process.